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Realizing the Digital libraries: assumptions and challenges underlying it.

J K Vijayakumar
Scientific Technical Officer, INFLIBNET Centre/UGC
PB 4116, Navrangpura, Ahmedabad-380009
E-mail: vijay@inflibnet.ac.in (or) vjkjk@yahoo.com

Manju Vijayakumar
Assistant Librarian, Nirma Institute of Technology
Chandholodia P.O, Ahmedabad-382481
E-mail: manjuvk@yahoo.com

ABSTRACT

THE FIELD OF digital libraries is in a constant state of change. Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities. Digital libraries are compilations of materials published electronically and those converted to digital form. There is considerable experimentation underway regarding the technical, economic, and organizational supports necessary for such distributed arrangements. The term "Digital Library" may be understood in different ways and named differently. The terms are used, sometimes synonymously, sometimes to denote a subset or a superset or sometimes to denote a rather different concept like virtual library, hybrid library, library with out walls etc. This article tries to make a framework for the term digital library by analyzing all terms in terms of its services, functions, collection etc. It discusses some technical issues and challenges for digital librarians. Some graphical representations also included for making clear the idea of digital libraries.

0. INTRODUCTION

Digital libraries (DL's) are emerging as an important area of research and education for information science, computer science and a number of other related disciplines. As many observers have pointed out, the term "digital library" means different things to different people. There is considerable experimentation underway regarding the technical, economic, and organizational supports necessary for such distributed arrangements. One sometimes hears the Internet characterized as the world's library for the digital age. This description does not stand up under even casual examination. The Internet- and particularly its collection of multimedia resources known as the WWW- was not designed to support the organized publication and retrieval of information as libraries are. As the digital library concept becomes more firmly embedded and assumes greater significance for public and organizational information policies and strategies, so the need for a framework to organize our understandings of these developments becomes more pressing.

1. CLARIFICATIONS

The term "Digital Library" may be understood in different ways and named differently. The following terms are used, sometimes synonymously, sometimes to denote a subset or a superset or sometimes to denote a rather different concept.

1.1 Traditional/Real Library

Holdings of Traditional Libraries are in hard copy form and there will not be any type of computerization, in terms of products, services or anything.

1.2 Virtual Library/Library without walls/Libraries for the future

We can say that these are libraries with out resources but access to resources and simply may be a collection of web sources. It is a library with little or no physical presence of books, periodicals, reading space or support staff, but one that disseminates information directly to the distributed users, usually electronically.

1.3 Electronic Library

Functions of an Electronic Library will be fully automated with CD-ROM/DVD-ROM networking. The resources are available in both electronic and conventional form. It indicates a rather limited approach to the digital library, simply indicating the provision of a range of material in digitized form, within the framework of traditional library provision. This envisages the library as a physical place, in which users may access digital resources one at a time. These electronic resources are selected, acquired and made available for access and searching in very much the same way as traditional resources.

1.4 Hybrid Library/ Gateway Library/Complex Library

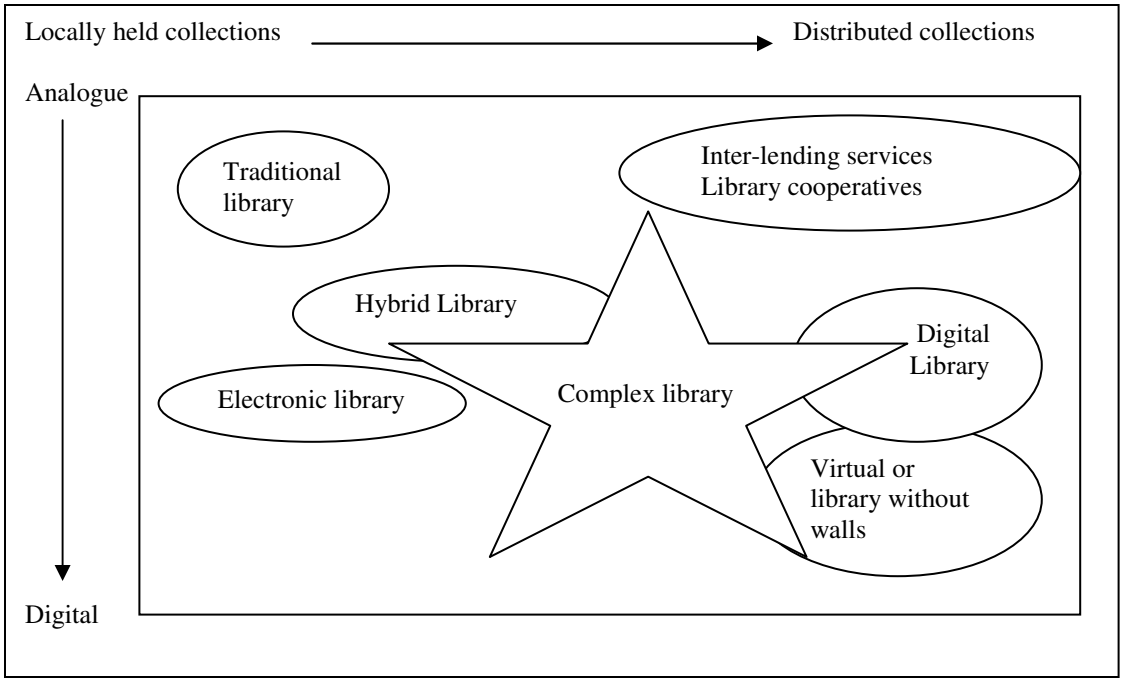
As a continuum from traditional library to the digital library, with electronic and paper-based sources used along side one another, hybrid library may be viewed as a transitional stage towards a truly digital library. The challenge of hybrid library is to integrate the access of sources in a variety of formats, and from both local and remote sources. A hybrid or gateway library provides an environment and services, which are partly physical and partly virtual or in a complex (libraries) way. Crawford's concept of 'complex libraries', covering all those systems and services having a degree of digitization. It preserves the general concept of the traditional library, library as a place.

1.5 Digital Libraries

Here the services are fully automated and all resources are in Digital form. A library/information service, located either in a physical or virtual space, or a combination of both, in which a significant proportion of the resources available

to users of that service only in digital form, even through remote access. It enables users to interact effectively with information distributed across a network. It could be based on a subject discipline, a vocation or profession, a region or a nation.

The following figure summarizes the relationship between traditional, electronic hybrid and digital libraries.



2. DEFINITION

The US Association of Research Libraries (ARL) identified five elements common to all definitions of the digital library, in 1995

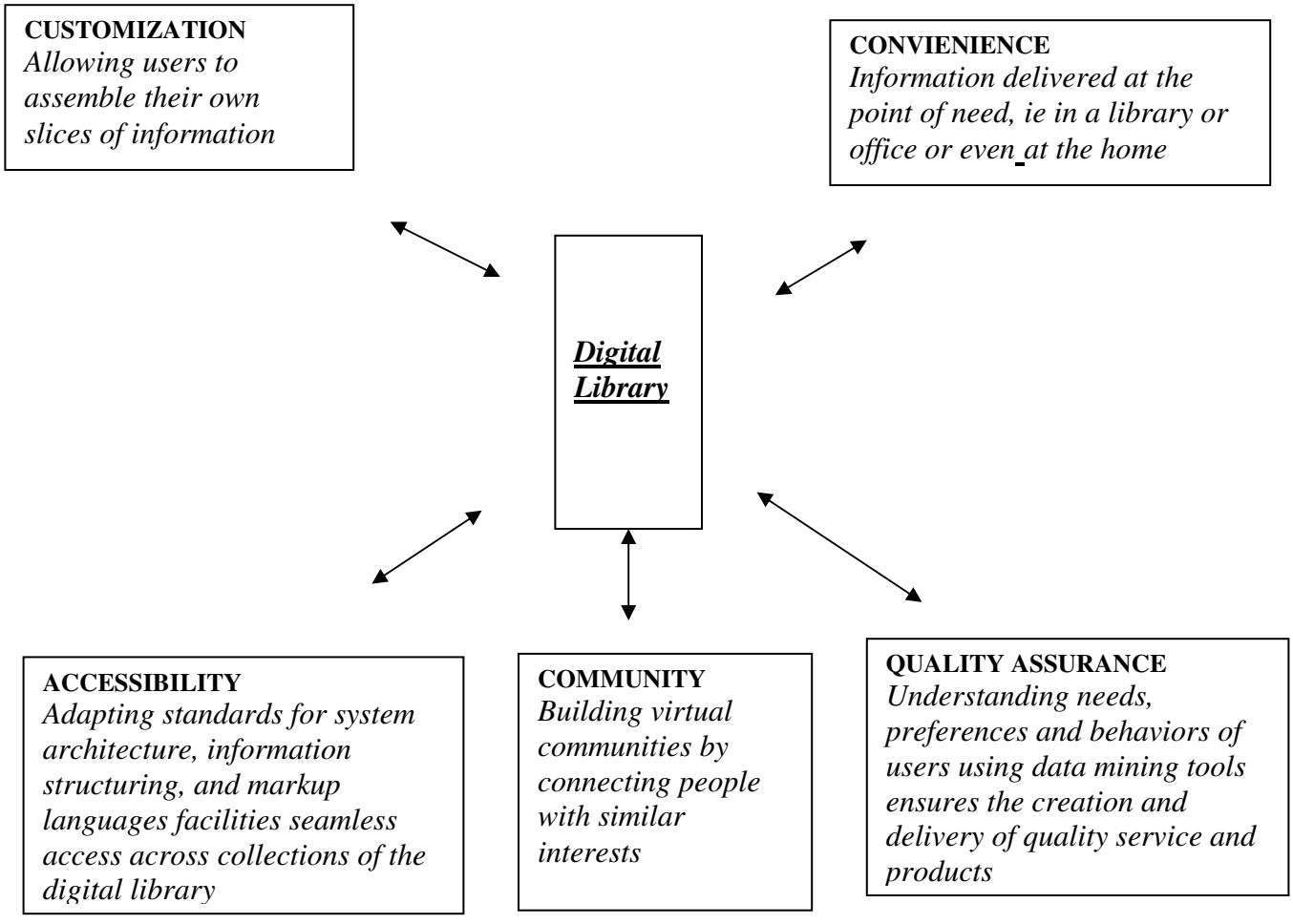
- The digital library is not a single entity
- The digital library requires technology to link the resources
- Linkages between digital libraries and information services are transparent to users
- Universal access to digital libraries is a goal
- Digital library collections are not restricted to document surrogates but include digital artifacts that have no printed equivalent

In broader sense we can define Digital libraries as organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities. Digital Libraries offer such benefits as equitable access, reduced barriers of distance, timeliness, shared resources and content delivery. A Digital library can be best considered as a library / information service,

located either in a physical or virtual space, or a combination of both, in which a significant proportion of the resource available to users of that service exist only in digital form.

3. CHARACTERISTICS

The digital library concept requires that librarians be information architects in order to build effective information service in this digital millennium. Characteristics of a digital library are summarized in the following figure.



3. CHALLENGES

In constructing a digital library service environment, the library becomes responsible for configuring access to a world of information of which it owns or manages only a part. Accordingly, the digital library is known less for the extent and nature of the collections it owns than for the networked information space it defines through a range of online services. In the commercial world, aggregators compete on the basis of the value-added

services that they layer on top of overlapping electronic collections. Similarly, digital libraries establish their distinctive identities, serve their user communities, emphasize their owned collections, and promote their unique institutional objectives by the way in which they disclose, provide access to, and support the use of their increasingly virtual collections. The ramifications of this emerging role for the digital library are far-reaching and reveal at least three key challenges.

3.1 Architectural and technical challenges

In developing a digital library service environment, the library seeks to enable meaningful navigation through and exploitation of distributed and heterogeneous information resources that are stored and managed in different formats and in different locations. Interested in gaining access to relevant information quickly and efficiently, regardless of format and location, users are not (nor should they be) contented with networked environments that require queries to be launched repeatedly at different collections and indices. At present, new information resources are generally added to digital library service environments through ad hoc efforts to develop appropriate resource discovery, authentication, resource delivery, user support, or other services. To respond effectively to these challenges, libraries must seek a degree of consistency in the information content they are integrating into their digital library service environments, and in the extent to which the systems architectures that govern development, maintenance, and support of those environments can be generalized and extended.

3.2 Collection development challenges

In a networked space, libraries continue to extend the breadth and scale of the scholarly and cultural evidence they make accessible to their users. Paper-based and electronic materials such as electronic journals and reference databases remain important. Libraries have focused much attention on digitizing selected special collections, and interesting collections have resulted. They tend, however, to be narrow in scope, shallow in depth, passive in appearance, and unsustainable financially and technically. The data that are produced in the conduct of business, government, research, and teaching have potentially vast educational and scholarly value. We need to think creatively about collection development strategies appropriate to the evolving digital library service environment.

3.3 Challenges of user engagement

In a digital library, how information is made, assembled into collections, and presented online affects whether, to what extent, and how it can be used. Here academic and research communities are the producers of digital content, including research data, dissertations, e-prints, and computer-assisted teaching materials. That content has enormous educational value, but only if it is assembled into professionally managed collections, maintained over the longer term, and made accessible to other end users. Scholarly communities are aware of the tools they require to manipulate information to effect within their own disciplines and are mobilizing, sometimes on a large scale, to supply those tools where they are unavailable from the commercial sector. In short, it is

not sufficient for the digital library to maintain exquisite collections. At least in an online environment, the maintenance of such collections is itself an act of publication—one that will have far-reaching ramifications for the nature of future research, learning, and cultural engagement.

3.4 Other Challenges

Digital preservation is also on the list of needed services, but fuller articulation awaits digital libraries coming to terms with organizational, legal, and financial implications of their new and evolving roles. The current digital library agenda has largely been set by the computer science community, and clearly bears the imprint of this community's interests and vision. But there are other constituencies whose voices need to be heard. Librarians have an opportunity, as yet unrealized, to debate our purposes with a broader spectrum of the population whose lives will be affected by the work we do. Stronger participation from the traditional library community seems essential at this time, where libraries, digital or otherwise, carry a strong symbolic charge. On the face of it, they are just one element in the larger circuit through which information travels from production to ultimate consumption. It is not necessary that digital libraries be managed within the context of conventional libraries. Services may originate from distributed sources and be integrated through the library in various ways. A variety of distributed repositories may offer digital collections, including the content and metadata, to various libraries, and may themselves offer complementary or competitive library services. Digital libraries are compilations of materials published electronically and those converted to digital form.

The difficulties of end-user searching in Digital Libraries can be listed as follows.

- Selecting source – end-users have difficulty in choosing from the many Internet searches engines and in keeping up with the features they offer.
- Formulating queries - people have difficulty in expressing their information needs in the syntax appropriate to the search system they are using.
- Formulating queries - they use only a few words in their search strategies, often even misspelling these.
- Formulating queries - they are reluctant to explore the more sophisticated features many search systems offer, such as phrase and name searching.
- Examining results - they accept that a significant number of the hits they do get will be irrelevant, because their strategies are matched against the whole of the Internet and the ambiguities in their search strategies produce noisy search results.
- Reflecting / stopping - they accept the fact that they will either be overwhelmed with hits or get nil results if they phrase their search incorrectly or search the wrong search system.

In recent years the library and computing communities have taken a number of approaches to address this situation.

4. CONCLUSION

It is clear that digital libraries promise an exciting new service paradigm for the library community in this digital millennium. Digital libraries are meant to provide intellectual access to distributed stores of information by creating information environments which advance access beyond electronic access to raw data – the bits -- to the fuller knowledge and meaning contained in digital collections. Electronic access is increasing at a rapid pace through global efforts to increase network connectivity and bandwidth, new information management tools, and importantly, interoperability across systems and information content. The quantity of online digital information is increasing ten-fold each year in a relatively uncontrolled, open environment. This pace of information creation far surpasses that of the development of technologies to use the material effectively. The number of people accessing digital collections though the WWW also shows explosive rates of growth. Finally, internationalization is making a "global information environment" a reality. The digital library is emerging as an organization that extends the breadth and scale of scholarly and cultural evidence and supports innovative research and life-long learning. To do this, it mediates between diverse and distributed information resources on the one hand and a changing range of user communities on the other. In this capacity, it establishes "a digital library service environment"—that is, a networked and Web-accessible information space in which users can discover, locate, acquire access to, and, increasingly, use information. Although access paths will vary depending upon the resource in question, the digital library service environment makes no distinctions among formats. Books, journals, paper-based archives, video, film, and sound recordings are as visible in the digital environment as are online catalogs, finding aids, abstract and indexing services, e-journal and e-print services, digitized collections, geographic information systems, Internet resources, and other "electronic" holdings.

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